Remarks

The above Amendments and these Remarks are in reply to the Office Action mailed August 13, 2003. No fee is due for the addition of any new claims. A Petition for Extension of Time to Respond is submitted herewith, together with the appropriate fee.

Claims 1-15 and 17-25 were pending in the Application prior to the outstanding Office Action. In the Office Action, the Examiner rejected Claims 1-15 and 17-25. The present Response cancels Claims 11-15 and 18-19, and replaces Claims 1, 10, 17, and 24, leaving for the Examiner's present consideration Claims 1-10, 17, and 20-25. Reconsideration of the rejections is requested.

I. REJECTIONS UNDER 35 U.S.C. §112

A. Claims 11-15

The Examiner rejected Claims 11-15 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Claims 11-15 have been canceled.

B. Claim 19

The Examiner rejected Claim 19 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

While applicant does not necessarily agree with the Examiner's position that the subject matter identified in Claim 19 is not sufficiently described in the Application, in order to expedite issuance of a patent, Claim 19 has been cancelled.

II. REJECTIONS UNDER 35 U.S.C. §103(a)

A. Claims 1, 10, and 17

The Examiner rejected Claim 1 as being unpatentable under 35 U.S.C. §103 based on *Liming* in view of *Tamai*. Claim 10 was rejected as being unpatentable under 35 U.S.C. §103 based on *Liming* in view of *Tamai* and further in view of U.S. Patent No. 5,906,654 ("*Sato*"). Similarly, the Examiner rejected Claim 17 as being unpatentable under 35 U.S.C. §103 based on *Liming* in view of *Tamai* and further in view of U.S. Patent No. 5,359,527 ("*Takanabe*").

Claims 1, 10, and 17, as amended, each include among other limitations "wherein the search area is determined based upon potential pathways from an origin." Likewise, *Tamai, Sato* and *Takanabe* all fail to teach this limitation.

Liming is a Patent Application Publication that was filed as a non-provisional application on January 18, 2001. That application claims priority to provisional application No. 60/176,489 ("'489 Provisional"), filed on January 18, 2000. (A copy of the '489 Provisional is included as Attachment A.)

As such, the '489 Provisional and *Liming* describe a technique for obtaining location-specific information. *See* '489 Provisional, p. 9. That technique may "include software and/or hardware capable of accepting search criteria . . . [and] present search results to a consumer." *Id.* at 10. As acknowledged by the Examiner, *Liming* does not teach "identifying a plurality of location in the search category with a search area; computing a first travel time from an origin to a first location; storing the first travel time and respective first location." Office Action, pp. 3-4.

Not only does *Liming* not teach the above limitations, *Liming* also does not teach the limitation of "wherein the search area is determined based upon potential pathways from an origin," as called for in Claims 1, 10, and 17. There is no discussion in *Liming* or the '489

Provisional of "a search area," much less any discussion of a search area that is determined based upon potential pathways from an origin.

Like *Liming*, *Tamai* also fails to teach the limitation of "wherein the search area is determined based upon potential pathways from an origin," as called for in Claims 1, 10, and 17. Referring to Figure 1 of *Tamai*, it teaches a vehicle navigation system 10 wherein information is provided to a microcomputer from an input unit 32, and guidance display data 40 is forwarded to a display unit 42, thereby informing the driver "in real time of what direction to take to follow the chosen route." *Tamai* col. 4, lines 50-55. Like *Liming* there is no discussion in *Tamai* of "a search area" or "wherein the search area is determined based upon potential pathways from an origin," as called for in Claims 1, 10, and 17.

In *Tamai* if the user wants the closest destination, either in distance or time, the system of *Tamai* identifies several locations, computes the desired information for each, and presents the best result. In contrast, the present Application identifies destinations that are within the "search area" and determines the information for those locations. Computing information for destinations within a search area defined by potential pathways not only decreases processing time by potentially reducing the number of destinations, it may also identify a destination that is physically farther away than another but quicker/easier to get to because it is on a main pathway (e.g. a highway) and thus within the search area determined by potential pathways. *Tamai* simply does not teach this claimed limitation.

Sato also fails to teach the limitation of "wherein the search area is determined based upon potential pathways from an origin," as called for in Claims 1, 10, and 17. *Sato* discloses a system for providing vehicle navigation to a destination in a category along a suitable route. As indicated by the Examiner, and as illustrated in Figure 2 of *Sato*, the system of *Sato* searches for a category, such as a convenience store, within a "search area." *See*, *Sato* Fig. 2. In particular, the "search area" as described in *Sato* "is selected from a 'large area' for search within

a 10 km radius from the current vehicle position, a 'normal area' for search within a 5 km radius from the current vehicle position and a 'small area' for search within a 1 km radius from the current vehicle position." *Sato*, col. 5, lines 26-30; Fig. 2.

Thus, the search area utilized in *Sato* is based upon a distance from the current vehicle position, it is not "determined based upon potential pathways from an origin," as called for in independent Claims 1, 10, and 17.

As described in the Application, defining a search area based upon potential pathways provides a defined search area that may include destinations that would not be included in a simple radius area because they are near a potential pathway. Referring to Fig. 4 of the present Application, search area 162 is not a simple radius area, it has peaks, such as peaks 166 and 167 because a user can easily access areas within those peaks due to the potential pathways. *See* Application, p. 7, lines 12-27; Fig. 4. *Sato* does not teach search areas that are defined based upon potential pathways.

Finally, *Takanabe*, which is used in combination with *Liming* and *Tamai* to reject independent Claim 17, describes a vehicle navigation system that, as stated by the Examiner, sorts destinations in ascending time order. *See* Office Action, p. 6. Like *Liming* and *Tamai*, *Takanabe* fails to teach the limitation of "wherein the search area is determined based upon potential pathways from an origin," called for in independent Claim 17. Thus, *Takanabe* fails to teach each of the limitations of independent Claim 17.

Thus, since *Liming, Tamai, Sato,* and *Takanabe* do not teach each of the limitations of independent Claims 1, 10, and 17, either singly or in combination, any combination of those references cannot render Claim 1, 10, and/or 17 obvious.

Accordingly, Claims 1, 10, and 17, as amended, are believed patentable under 35 U.S.C. §103(a) over *Liming, Tamai, Sato,* and *Takanabe*, and the withdrawal of the Examiner's rejection of Claims 1, 10, and 17 based on 35 U.S.C. §103(a) is requested.

B. Claims 2-9, 11-15, and 18-25

Claims 11-15 and 18-19 have been cancelled. Claims 2-9 and 20-25 each ultimately depend from independent Claims 1 and 17, respectively, and should therefore be patentable for at least the same reasons as independent Claims 1 and 17.

It is submitted that these claims also add their own limitations which render them patentable in their own right. Applicant reserves the right to argue these limitations should it become necessary in the future.

Accordingly dependent Claims 2-9 and 20-25 are believed patentable under 35 U.S.C. §103(a), and withdrawal of the Examiner's rejection is requested.

III. CONCLUSION

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowable, and a Notice of Allowance is requested. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting issuance of a patent.

Enclosed is a PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. § 1.136 for extending the time to respond up to and including December 13, 2003.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

Date: 11/21/03

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ATTACHMENT A

SYSTEM AND METHOD PROVIDING LOCATION CONTEXT INFORMATION USING AN ELECTRONIC NETWORK

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SYSTEM AND METHOD PROVIDING LOCATION CONTEXT INFORMATION USING AN ELECTRONIC NETWORK

Background of the Invention

1. Field of the Invention

The present invention relates to the fields of data and telecommunications networks, such as the Internet. More specifically, the present invention deals with information search and retrieval technologies, such as world wide web (WWW) search engines and directories; geographic location determination, navigation, and mapping technologies; public directories, such as regional telephone directories; and electronic recording and automation.

2. Description of the Related Art

In recent years, the demand for publicly accessible electronic search facilities has exploded with the growth of the Internet. The increased demand is being met by an ever-increasing number of Hypertext Transport Protocol (HTTP), or World Wide Web (WWW or Web), based search engines and/or directories ("search methods"), such as Yahoo, HotBot, Excite, and Infoseek. These search methods provide reasonable access to average information, and at little or no cost to the consumer.

As new search methods come online, they typically enhance existing services or introduce new services. Such improvements are typically focused on new methods of storing, indexing, and/or retrieving data. Examples of such improvements include "natural language" searches, and keyword searches.

Typical Internet search methods facilitate document retrieval by employing automated agents to continually comb the Internet. When an automated agent finds a new article, news clip, financial statement, research project, or other document, the automated agent adds the document to its index.

Although some Internet search methods specialize in finding specific individuals or businesses, currently no

business or individual targeted Internet search method utilizes standardized indexing. In addition, present Internet search methods do not include the geographic location of businesses and/or identify the services provided by those businesses. Without such information, searching for specific types of businesses, services, information, or documents available within a geographic area is difficult or impossible.

New standards, such as Extensible Markup Language (XML), have recently been introduced which give better definition and structure to information, which should improve both the quality and availability of information returned by an Internet search method. However, although these standards may improve search results, these standards are too new to be widely used.

New devices and new technologies which allow remote access to the Internet are also in development or beginning to come to market. For example, some portable devices such as cell phones, pagers, and personal digital assistants are able to access Internet search methods and other specially designed web sites.

In light of the many technological changes, many businesses are choosing to create a website or other information dissemination tool. For example, many banks now

have their own websites. At a bank website, a consumer may find a listing of ATM machines operated by that bank and, if they are lucky, perhaps a map showing the ATM locations.

While such information may be convenient for a local consumer, travelling consumers may be presented with additional obstacles. For example, a consumer would need to know which banks serviced the area they are visiting, as well as the location of the ATMs listed with respect to their current location. Even when a consumer precisely knows their present location, such as when using Global Positioning System (GPS) or other location determination equipment, current Internet search methods are of little use.

Location determination equipment, such as the Global Positioning System (GPS), is becoming more accessible to the general public. Small GPS receivers are capable of accuracy sufficient for common consumer and business uses. GPS receivers have even been built-in to larger systems such as automobiles, boats, and airplanes, and smaller systems, such as watches, to facilitate navigation. Some of the more sophisticated units even include graphically displayed maps and routes.

Other location determination methods and systems are also in use. In the cell phone field, methods using Time

Difference of Arrival (TDOA), Signal Attenuation, and Angle of Arrival measurements are known. These are used, or are being considered for use, in applications such as location dependent phone call billing and do not incorporate or require GPS. Additionally, facilities and services exist for determining geographic coordinates from generic geographic descriptions, such as postal addresses, in a process known as geocoding. A demonstration of this may be seen at the Etak company website at http://www.geocode.com/.

Although a customer may use a GPS or other device to determine their exact location, it is difficult, if not impossible, to determine which businesses, services, or other points of interest are most accessible from that location. As previously described, the Internet search methods currently available are not designed to facilitate this type of search. Users of traditional, paper-based systems, such as telephone directories, fare only slightly better.

Telephone directories are typically regional in nature, containing entries which are generally limited to a state or metropolitan area. The information in these directories is typically classified by major business area, however, because information supplied is typically geared toward

advertising, the content is free form and without enough structure to be useful for very specific searches.

For example, if a person wanted to find Automated Teller Machines (ATMs) near their location, the phone directory would not be a very efficient tool. If a person looked for ATM's in the "A" section, they might find manufacturers of ATM teller equipment in that area, or possibly other, unrelated items, such as Asynchronous Transfer Mode (also ATM) telecommunications equipment. A searcher must know to go to the Bank section and review individual listings of each bank in order to attempt determine nearby ATM locations. Such determination can only be made by visually comparing the listings of many banks, some of which may not list ATM locations.

Paper-based telephone directories also have other drawbacks, including their size. This makes paper phone directories inconvenient, such as when driving or traveling by other means. Paper telephone directories are also typically organized in only two ways, by business classification and by business name. The ability to organize information in other means may be more convenient.

Some telephone directory providers have placed their directories on websites, and have included search capabilities. However, a device interfacing with a typical

telephone directory provider's website cannot provide a base location to the search component. Instead, users are required to enter their location manually.

Manual entry of location information is unreliable, for several reasons. First, some generic location identifiers, such as zipcodes, are not specific. For example, zipcodes can define irregularly shaped regions. Second, generic location identifiers often define a region larger than a consumer may wish to search. Third, a consumer or user may not know their current address, zip code, or other location identifier. Fourth, location information may change over time, as when driving. Fifth, users are prone to typographic or other mistakes.

Additionally, current directories, both electronic and paper-based, are not structured to indicate service points, such as teller machines, or other important information, such as the times of availability. Instead, current directories typically divide content by general business categories, as described above.

Summary of the Invention

The invention provides for the unique development, application and integration of technologies in several areas, which are discussed below. The discussion is followed by a description of developments and/or improvements, and an integrated process.

The present invention may provide new and improved systems and methods comprising a "Location Context Information System". A location context information system, in accordance with the present invention, may allow consumers to identify businesses and services available within a selectable geographic area. Additionally, the system of the invention may provide other functionality, including, but not limited to, event control, reminder triggers, or advertising initiation, based on a consumer's location.

The present invention may allow client devices, like personal computers, cell phones, pagers and personal digital assistants, to search databases and directories for location-specific information. Databases which may be searched may be local to the device or remotely accessible through telecommunications or other networks, like the Internet. Such databases may be comprised of information about businesses and services, including, but not limited

to, geographic locations, service or business type, and availability, stored in a table or table(s).

The present invention may also include software and/or hardware capable of accepting search criteria ("client"). Consumer search criteria may include, but is not limited to, a service or business type and a geographic region. A client may search a database or multiple databases for services similar to or matching those specified by a consumer which may be available within a geographic area. A client may also present search results to a consumer.

The present invention may determine a geographic region through a combination of multiple latitude measurements with multiple longitude measurements, or through other methods. A bounding area may facilitate fast "set logic" searches of a similarly encoded search database, thus returning businesses or services inside a given bounding area.

The present invention may also provide multiple means of specifying and determining geographic information at the client end. By way of illustration, without intending to limit the present invention, geographic information may be displayed on a graphical map, and a consumer may specify a location or review search results through a map. A display may also include information presented in terms of miles or kilometers, and GPS or other measurements may be substituted

or superimposed. In addition, the present invention may allow a device to automatically determine a location through technologies such as GPS or TDOA measurements, or through a connection to a device with these capabilities.

The present invention may also allow for location identification though geocoding. Geocoding may determine geographic coordinates from a more general location identifier which may be available as an external service over a telecommunications network, such as a postal address.

The present invention may further provide multiple means of location identification, as well as a facility for choosing a preferred method and a hierarchy of methods. As an illustration, without intending to limit the present invention, the present invention may use a range constraint, such as a radius, in conjunction with a location to define a location context or geographic area. The present invention may assume a default, customizable range if a range is not given. Range and location measurements may be combined to define a geographic region for search purposes.

In addition to location determination and search creation, a client may also allow a consumer to create custom "waypoints". Some location determination systems, such as GPS, define waypoints as specific geographic coordinates, such as longitude and latitude. The present

invention may extend the concept of a waypoint to include both a specific geographic location and a geographic region. Geographic regions may be defined by a set of one or more geographic points, or a geographic region may be defined by a specific geographic point and a distance, or range, from that point. The present invention may allow text, audio, video, or other information to be associated with waypoints.

Waypoint information may be stored locally in a device, or waypoints may be stored remotely. Waypoint information may be used as a basis for future location context searches. Storage and retrieval of waypoints may facilitate searching, as a consumer does not have to enter or determine their location for every search.

Waypoints may also be a basis for alert or event triggering (collectively referred to as event triggering). A client may allow a consumer to create custom events, to associate an event with a waypoint or other location context, and to store events and associated location contexts in an event queue. Event information may include display or playback of audio, video, or other media. Event information may also allow integration with home automation or other systems.

An event queue may associate waypoints or other location contexts with event information. A processor or

trigger facility may periodically compare client location to location contexts in an event queue, and trigger an associated event if a client is at or near a specified location.

One way in which the combination of waypoints, event information, and location context may be used, without intending to limit the present invention, may be illustrated through the following scenario: A consumer regularly passes a grocery store while driving to and from work. One morning, she realizes that she needs to pick up milk and eggs on her way home; she could record a reminder like "pick up milk and eggs", and associate that event with her current location (i.e. near the grocery store). As she nears the grocery store on her way home, the "pick up milk and eggs" event would be triggered, reminding her to stop and pick up the desired items.

The combination of waypoint markers, waypoint proximity alarms, and the above described directory search facility may allow sharing of a network service directory, custom waypoint directory, and custom event queues. For example, using the grocery store example above, if a consumer was not actually passing the grocery store, but was instead in a driveway, a directory search for grocery stores in the geographic region could be performed. A consumer could then

pick the grocery store in which they are interested from a list, record the same "pick up milk and eggs" message, and associate the message with the chosen location.

In addition to custom, consumer created events, an event queue may also contain event and location contexts from other sources. In addition to event queue information, a client may also receive custom media, such as audio or video advertising. Combinations of events and media may allow a client to present advertisements to a consumer based on client location.

On the Internet, marketing firms such as doubleclick.net and others are tracking where consumers travel on-line and what sites they are visiting in order to target advertisements and promotions effectively. Meanwhile, businesses use TV, radio, and print ads to market to consumers using other, but related measures including demographics and viewer or listener profiles. The integration of advertising and location detection technology provides another valuable piece of information for effective targeting advertising.

Advertisers may be interested in a consumer's location, a geographic region about which a consumer has an interest, or a location in which a consumer may be searching for services, and is thus likely to visit. Just as there is no

well defined directory of services and their geographic location, there is no method for precise, location based advertising targeting specific geographic locations.

Brief Description of the Drawings

Figure 1 is a block diagram showing the structural elements of the present invention.

Figure 2 is a state diagram showing the high-level logic of the combined process.

Figure 3 is a state diagram showing a combined algorithm for location determination across multiple client devices.

Figure 4 is a database table, referred to as service_table, which is part of Service Database 202 (SD202).

Figure 5 is a database table, referred to as service_class_table, which is part of Service Database 202 (SD202).

Figure 6 is a database table, referred to as meta_directory_table, which is part of Service Database 202 (SD202).

Figure 7 is a sample illustration of an event queue.

Figure 8 is a database table, referred to as ad_matrix_table, which is part of Advertising Database 208 (AD208).

Figure 9 is a database table, referred to as ad_table, and is part of Advertising Database 208 (AD208).

Figure 10 is an flow chart illustrating operations carried out when conducting a "location context" service search of a service database.

Figure 11 is an flow chart illustrating operations carried out when conducting a "location context reminder".

Figure 12 is a flow chart illustrating operations carried out when conducting a "location context home automation event".

Detailed Description of the Preferred Embodiment

The following paragraphs illustrate the structural and operation aspects of the present invention. Structural aspects are illustrated first, followed by discussions of operational aspects.

Figure 1 is a block diagram showing the structural elements of the present invention. Figure 1 includes block 100 ("System 100"), which represents a client portion of the present invention, and block 200 ("Server 200"), which represents a server portion of the present invention.

System 100 includes processor 102, user interface 104, audio visual recording device 106, location determination device 108, network access device 110, and data storage sub-system 112. Each component of system 100 may include hardware, software, or a combination of hardware and software. Each component of system 100 may communicate with other components through a data link, bus, network connection or other, standard data communications vehicle.

System 100 may also communicate with external devices, such as vehicle navigation systems, media players, or other devices. Communication between external devices and system 100 may be facilitated through data bus, network, parallel, serial, USB, infrared, wireless modem, wireless local area

network, or other interface. Figure 1 illustrates communication through line 113, and illustrates external devices as generic local external device 114.

System 100 may contain an automatic data processing system, illustrated as processor 102. Processor 102 may comprise one or more central processing units (CPUs), random access memory, read-only memory, input-output controller and/or bus, permanent or semi-permanent data storage, and operating system software or environment.

The present invention may be suited to multiple applications, including automotive information systems, cell phones, and personal computers; therefore, exact embodiments may vary depending upon a specific application. For example, an embodiment used in an automobile may utilize the MobileGT Architecture. MobileGT is a joint venture of Motorola, QNX Software Systems Ltd., IBM, and Embedded Planet, and is targeted for automotive driver information systems. For other applications, a preferred embodiment may be a more traditional processor/operating environment, as found in many forms in network capable, wired or wireless devices currently available or in development. Examples of such devices include typical personal computers based on Microsoft, Sun, Linux, or Apple operating systems and various processors from Intel, Sun, and Motorola; 3Com's

Palm devices; consumer electronics devices based on the Microsoft Windows CE or Java operating systems or other operating environments such as the QNX Neutrino; wireless web enabled telephones, such as the Qualcomm "pdQ Smartphone"; and Internet capable cable television or similar set-top boxes.

System 100 represents a typical, network-capable, extensible, electronic device or architecture with illustrated sub-components incorporated as built-in elements or accessible through common data channels, buses or network links. For the purpose of the present application, it is convenient to collectively refer to a combination of processor 102 and an operating system, discussed above but not illustrated in the drawings, as processor architecture 102 or PA102. Interaction between devices and operating systems will be readily understood by those skilled in the art and related fields.

User interface 104 may comprise a visual display, such as a CRT or LCD, and data entry or operational controls, such as buttons, dials, or keypads. User interface 104 may also allow voice control through voice recognition and/or speech processing.

User interface 104 may interact with PA102 to accept consumer input such as search criteria, positions to mark,

custom directory entry descriptions, system settings, control event commands, default range values, data storage and retrieval commands, alert selection, and controls for the recording of audio/visual information. User interface 104 may present output from PA102 and system 100 components, such as search results, advertising content, component status information, location information, contents of data storage locations, event queues, custom directory contents, network connectivity status, and similar information.

Component 106 represents a multimedia functionality for recording and playback of audiovisual information. Component 106 may comprise a microphone, speaker, video camera, or video display, or any combination thereof. Information recorded via component 106 may be transmitted, stored in, and retrieved from data storage sub-system 112 through PA102. Information recorded via component 106 may be transmitted over a network to remote data systems, such as sub-system 204, via network element 110 over link 201.

Location context triggered events stored in an event queue acting as part of system 100 can interact over PA102 to retrieve stored audiovisual information from data sub-systems 112 or 204, and transmit them to audiovisual component 106, user interface 104, and devices. User input at user interface 104 may control recording, playback, and

transfer of audio visual information to and from component 106, and other devices, such as a home computer or remote storage.

Geographic location determination capability (GLD 108) may determine reasonably accurate geographic locations in near real-time. This may be equivalent to location determination capabilities of modern GPS equipment, such as that made by GARMIN Corporation. GPS equipment may take the form of separate, hand-held receivers, or may be integrated into other systems, as in modern automobile or flight navigation systems. GLD 108 may use other location determination methods, either in combination with or instead of GPS. An example of other location determination method contemplated in a preferred embodiment is Time Difference of Arrival, which is used in the cell phone industry for determining location without GPS.

In some embodiments, it may not be necessary to include location detection capabilities. For example, a home computer, which is stationary or semi-permanent, may not need location detection capabilities. However, an ability to translate a desired geographic location to a coordinate system may be advantageous, even in stationary or semi-permanent configurations.

To achieve geographic location translation, the present invention may utilize geocoding. Geocoding may allow a consumer to input postal addresses, area codes, or other region-specific information, and translate that information into more precise geographic coordinates. The preferred embodiment can implement several methods for geographic determination and provide for GLD108 to interact with PA102 to implement a consumer specified hierarchy of preferred methods for geographic position determination and use, as outlined in the logical process diagram, Figure 3.

Component 110 represents network access capability. Component 110 may comprise hardware typically used for wireless network access, such as in Internet capable cellular phones; PDA's like 3com's Palm VII connected organizer; wireless portable computing devices like Metricom's ricochet technology; or wired access like a home or business Internet connection, such as a DSL modem, ISDN terminal adapter, CSU/DSU/router combination, telephone modem, or other common public and private network access methods. Element 203 is a "network cloud", which encompasses a combination of devices, connections, and protocols supporting internetworking of components not local to system 100.

Data storage sub-system 112 (DS 112) may be a typical permanent or semi-permanent storage method, similar to those in modern computing and other electronic devices configured to read and write data. DS 112 may be any readable, erasable, writeable and/or re-writeable media and components, such as data storage methods found in devices such as personal computers, PDA's, and cellular phones, and may be a hard disk; removable media like a floppy, superdrive, or zip drive; or memory cards similar to flash memory and SmartMedia cards used in mp3 audio players like Diamond Multimedia's Rio player, and digital cameras like those from Olympus.

Service Directory/Database 202 (SD 202) is a directory database, and/or computing component with network connectivity. In a preferred embodiment, DS 202 may include a relational database management system, such as Oracle 8, by Oracle Corporation, or Sybase Adaptive Server, created by Sybase; an LDAP type directory, such as Netscape's Mission Control or OpenLDAP's "OpenLDAP Suite"; and/or a computer system (processor/operating system), such as a SUN UltraSparc 4000 running the SOLARIS operating system, or an Intel processor based machine running Linux or Microsoft Windows NT operating systems. Some newer systems have combined Directory/Database capabilities such, as Oracle

8i's Oracle Internet Directory (OID) which is integrated into their backend data store.

Directory and database components comprising SD 202 may run on a single computer, each component may run on separate computers, or components may be distributed across multiple computers. Through a combination of database, directory, and computer system, SD 202 may provide effective and efficient data storage, organization, and retrieval in a manner can be will be readily understood by those skilled in the art of information and systems management.

Advertising system 208 (AD 208) and Custom Database 204 (CD 204) may be similar to SD 202, and may themselves exists on the same system as SD 202 or be distributed among several others.

Site 206 (ST 206) may be a structure like a home or office building, with network capability provided by network access device 210 (NAD 210). ST 206 may contain a computing facility (CF 212) which may be similar to SD 202 or common personal computers, workstations, and servers. ST 206 may also contain a local area network (LAN) connecting other similar devices at a location via a network such as an Ethernet. ST 206 may contain home or building automation capability, based on standards such as X10, or other computer controlled automation systems for controlling HVAC,

VCR, stereo, security, and other commonly controlled building and home components or networked devices.

The aforementioned and described systems illustrated in Figure 1, and those in the following discussions, are intended to illustrated preferred embodiments of the present invention and are not intended to limit the present invention. For example, as is described below with regard to FIG.'s 4-9, the data stored in the databases maintained by SD 202, CD 204 and AD 206 may vary to suit requirements or details of a particular implementation. Such changes may be readily appreciated by those skilled in the art of computer system design and implementation.

The following paragraphs describe preferred embodiments of database tables used in the present invention. Database tables may store well defined services, their geographic area of availability, and time of availability, thereby providing rapid, accurate searching of businesses, services, and information available within a geographic context, and at a particular time. FIG.5 is a table, called service_table, which contains a list of uniquely identified services. FIG.5 has a traditional database table configuration in which columns define fields and rows define records.

The service_table can contain a list of categorized or classified services and their geographic location of availability. Service_table may store information about SERVICE IDENTIFIERS, SERVICE LOCATION IDENTIFIERS, SERVICECLASS or category SUBCLASSES, which are typically more specific sub-categories, SERVICE AVAILABILITY TIMES, and SERVICE PROVIDERS. The SERVICEID field may uniquely identify each row or service, by type of service, location and provider. Type of service may be defined by CLASS and SUBCLASS fields, which may be numeric ids relating to a table, identified as service_class_table, containing service classes or categories, and a CLASSID field which may be used as a key field.

A separation such as previously described is known as normalization in the database management field and will be easily understood by someone skilled in the field. In practice classifications may be more highly categorized and normalized into meta-categories and groups of categories and sub-categories to facilitate a robust, scaleable system supporting accurate distinction of many well defined services, and will be readily understood by those skilled in the art of database design and management.

With such a system in place, an effective and efficient location context search maybe performed on SD 202 from

system 100 over NC 201 using a standard method such as a Structured Query Language (SQL) query. A SQL query to retrieve information from SD 202 may look like: "select * from service_table where latitude > 33 and latitude < 34 and longitude > -76 and longitude < -77 and service_table.subclass = 0101". Such a query may find all Notary Public service providers within a desired geographic area. Such a query may be formed by a combination of consumer selected service category, selected or entered via user interface 104; a geographic range, or a default range in the event a range was not entered at the time of the query by a consumer; information from GLD 108 defining a client's present location.

A software process ("CLIENT QUERY PROCESS"), which may be part of system 100, such as a program or process running on PA 102, may combine consumer criteria with GLD 102 provided location information into a SQL query and submit a query to a SERVER QUERY PROCESS running on service database SD 202 machine. In practice, a CLIENT or SERVER QUERY process may form criteria in to a fully formed SQL query. If a server process forms a query, then CLIENT PROCESS need only pass criteria via an established protocol, in a manner similar to common Internet client/server protocols, such as Simple Mail Transport Protocol (SMTP), Hyper-Text Transport Protocol (HTTP), and many others.

A SERVER PROCESS on SD202 may return results of a query to an initiating QUERY PROCESS on PA 102, to be displayed on user interface 104. In a contemplated embodiment, a process running on PA102 may handle query generation, submission, and results processing, as is typically done on the Web with CGI type scripts or programs such as those written in Perl, Java, C++ or C.

FIG. 6 illustrates table meta_service_table, which may be used by an automated process in a distributed service directory architecture. An automated agent can connect to a service provider or top level authority for distributed areas of a service directory, such as large corporations or government agencies, to update actual service directory information listed in service_table. For example, an automated agent may connect to a master service directory of each provider listed in meta_service_table on a daily basis. During a connection, an automated agent may download contents from a provider's updated directory of locations, including service points like ATM locations. Current entries in service_table may be removed for that provider and replaced with new information. An update interval need not be a regular time interval, and may be driven by performance or other constraints.

In a preferred embodiment, common data structures and protocols may be defined which create a distributed service directory authority so that a monolithic, even though potentially distributed, directory is unnecessary. A distributed service directory, much like currently existing X.500 and LDAP directories, may instead be created.

Advertising database (AD 208), a database management system running on a server computer with a network capability, may be of a similar structure to SD 202. The primary difference between AD 208 and SD 202 may be data table structure. Modern database systems can support many tables in one database management system and many distinct collections of tables and other database objects such as stored procedures within in separate logical entities called databases even within one database management system on one server. Thus, in effect the functionality and components of Advertising Database 208 may be in the same database and on the same machine as Service Database 202 and/or Custom Database 204 or in different database on different or the same computers. The implementation of wide-area database management systems to achieve functionality of database systems SD 202, AD 208, CD 204, in whole or in part, and systems like them described herein, will be readily understood by those skilled in the art.

In a preferred embodiment, AD 208 contains a table which contains information about advertisements or media content, advertisement unique identifiers (ADIDs), SERVICEPROVIDERIDs, location contexts, SERVICE CONTEXTs, media type descriptions or MIMETYPEs, media DIMENSIONs such as time duration or resolution and size, and the media content itself (ITEMs) or pointers to the local or remotely stored media identified as the LOCATION which may contain filenames, URL's or similar media location identifiers. A query of AD 208 may be made in parallel with a search of SD 202. A search of AD 208 may yield advertising content or other information relevant to system 100's location. Searching AD 208 may also incorporate a SERVICE CONTEXT which may be information relevant to a type of service that was searched for by system 100. Location context or SERVICE CONTEXT may be used as a query condition for searching AD208 or they may be used in combination. Additional location context INFORMATION, which may be of an advertising nature, may thus be returned to client system 100, along with specifically searched for location context INFORMATION. Location context information may comprise a service or set of services that are available within the geographic constraints, and possibly time constraints used in the search.

A preferred embodiment may include another table as part of AD 208, which may contain client locations, queries, and a network address associated with a client. A SERVICE CONTEXT may be similar to a SERVICECLASS, or may be an identifier of a set of grouped SERVICECLASSES.

Custom Database CD 204 may be a database management system running on a server machine, and may be similar to SD 202, with a network capability. CD 204, as described above for other database systems, may be a part of SD 202, or a separate entity. CD 204 may contain a database schema or structure and set of tables which support remote storage and retrieval of important data elements of system 102, such as recorded audiovisual information, event queues, location contexts, search criteria and past search results, default range, and related information.

CD 204 may serve as a caching server and remote storage or backup facility for aforementioned data elements for each consumer. In a preferred embodiment, CD 204 may allow sharing of data elements among different client devices, such as would be the case where one customer has both an automobile based client device and a cell-phone type device. In addition, CD 204 may facilitate sharing of "location context information system" functionality across multiple

devices, such as sharing a custom database or location contexts across devices or with other consumers.

Geocodeing service(GS 01) is a network accessible geocoding facility which may facilitate conversion of location descriptions, such as postal addresses, into accurate and precise geographic location contexts, such as latitude and longitude. GS 01 may offer functionality similar to that which is available from Etak at the company's website at http://www.geocode.com/. GS 01 is not included in the figures, as GS 01 may be a network accessible facility, a component of a device, or a system connected device, such as an vehicle navigation system.

Map Service (MS01) may plot geographic areas on graphical maps using systems similar to current automobile and hand-held navigation systems. In addition, MS 01 may obtain maps from a network facility, like MapQuest (http://www.mapquest.com). MS 01 is not included in the figures, as it may be a network available service, part of system 100, or an interconnected component, as in a vehicle navigation system.

Previous discussions were concerned with structural aspects of the present invention. The structure provides for a "location context information system" supporting a plurality of valuable applications, therefore the following

discussion will illustrate salient features of the present invention by discussing an operational process. A preferred embodiment will be discussed for performing a location context service search of a service database as illustrated in FIG. 10.

Figures 11 and 12 illustrate other operational applications including playback of location triggered audio reminders (FIG. 11) and location triggered home automation events (FIG. 12). These other applications are merely illustrated by the figures and not discussed as they utilize the same key features in the described embodiment.

Figure 10 is a flow chart of the steps for allowing a person to conduct a location context information search for services available within a well defined geographic area.

At step S1, a consumer enters a service for which they are searching and a geographic range over which they would like to search, such as Automated Teller Machines (ATMs), within 2 miles.

At step S2, a client device (system 100) processes a request and, by a default set in a location determination method hierarchy, a client device may determines it's current location via GLD 108.

At step S3, a client device invokes a process, called "query process", on PA102. Query process may combine a location provided by GLD 108 with a range value and desired service criteria, such as a code representing ATM machines. Combined values may form the basis of a search of Service Database 202 (SD 202) for services matching the service code or class which are available within the geographic area defined by the location and range.

At step S4, database SD202 may return a result set of records specifying services available within a geographic area to a query process.

At step S5, a query process may present resulting records through user interface 104.

At step S6, a consumer may be satisfied with search results, but wishes to see a map with the result locations superimposed, and indicates a desire by a user interface control.

At step S7, system 100 may present a graphical map view of a consumer's current location and service points identified by a query.

At step S8, a consumer may wish to store results or portions of search criteria, such as the location context, service class, or results, for ease of recall or future

queries. Storage may be facilitated using controls on user interface 104 which cause system 100 to store requested items in data sub-system 102.

In a preferred embodiment, as illustrated by the line from step S3 to step S9, a process may spawn another process, or communicate with another process, to store client location. Client location information, along with search criteria, may be stored in ad_matrix_table, which may be part of Advertising Database 208 (AD 208). The line between steps s3 and s9 also includes spawning of or connection to other processes, and searching of ad_table as indicated in step S10, which is also part of AD 208.

As indicated in step S11, results from a search of AD 208 in step S9 may be returned to a client device, along with results from step S5.

The aforementioned discussion is meant to illustrate key features provided by the present invention by showing the operational steps through one preferred embodiment of the invention. Although some aspects of the illustration may show data arriving synchronously, or may illustrate data flow in a definite pattern, one skilled in the art will recognize that modification of data flow patterns or data arrival may be made without effecting functionality. For example, results from a search of SD 202 and AD 208 may not

simultaneously arrive at a client device, as would appear from the figure.

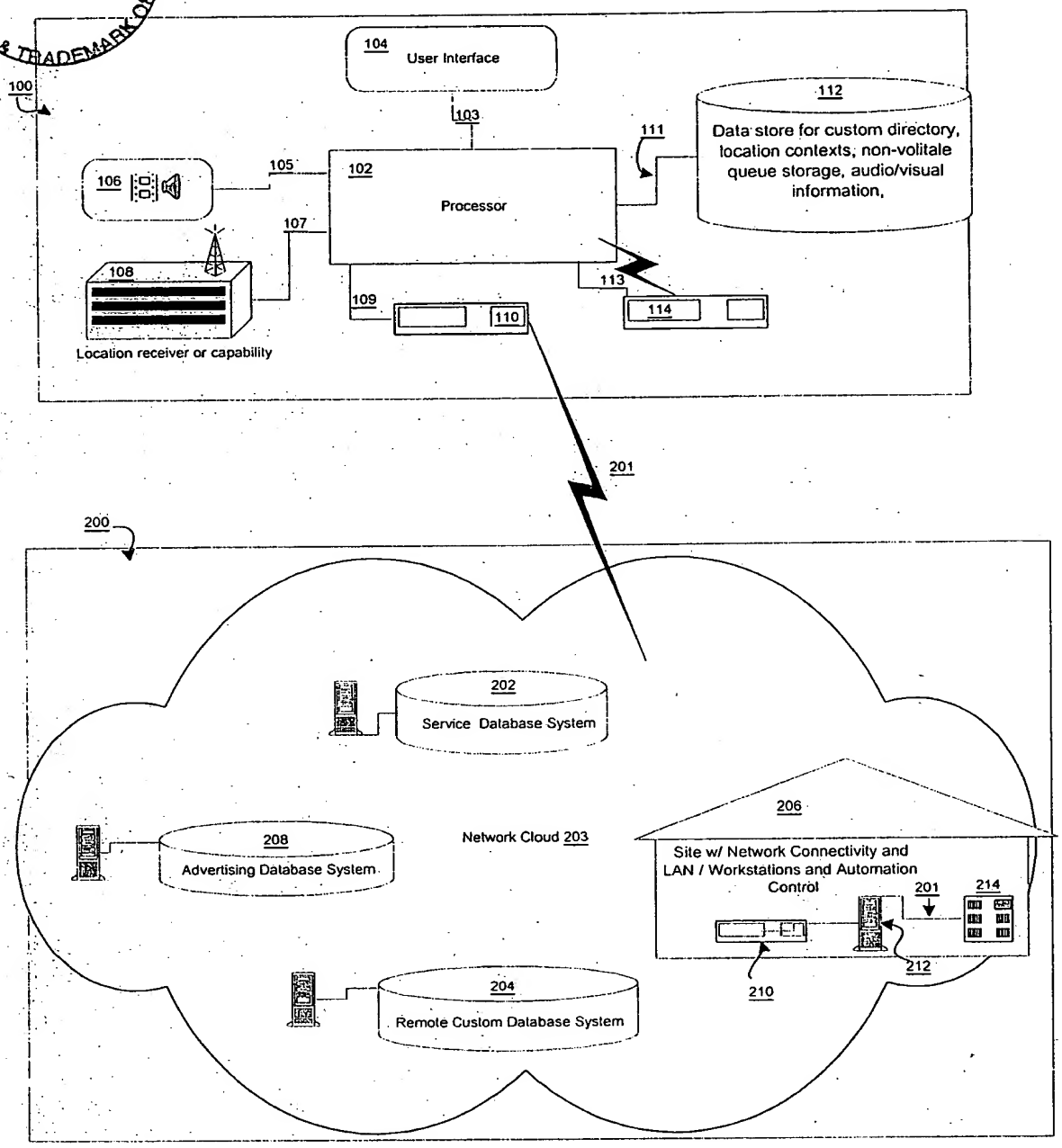

FIG.1

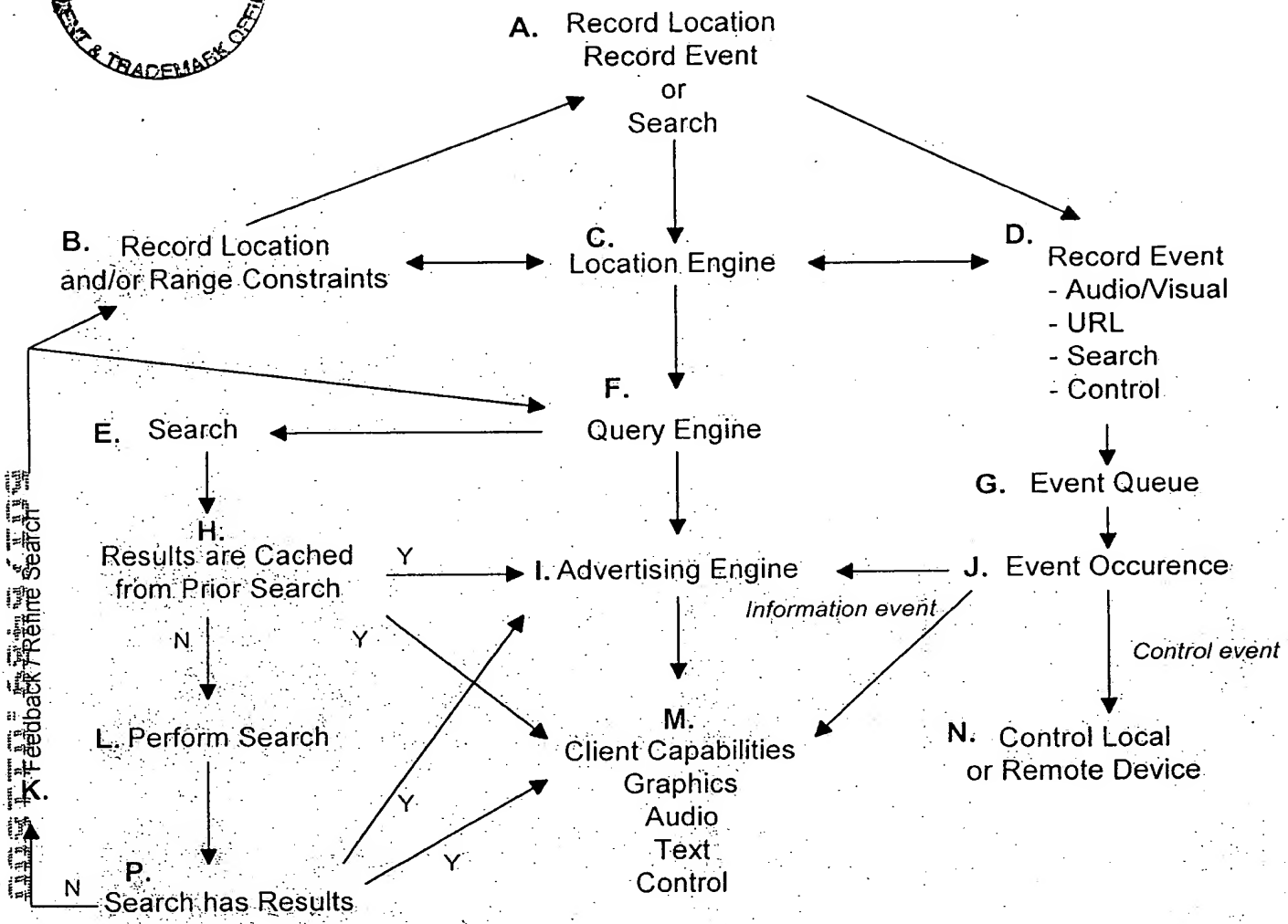

FIG. 2

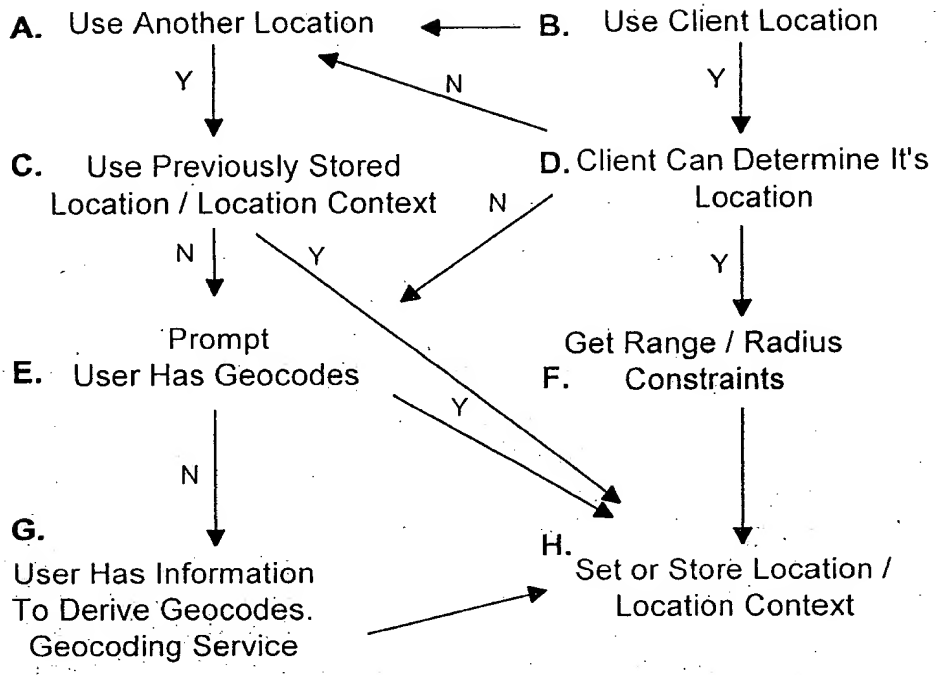

FIG. 3

	SERVICEID	LATITUDE	LONGITUDE	CLASS	SUBCLASS	TIMEAVAILABLE	SERVICEPROVIDERID
R1	123456789	38.923190	-077.222517	0100	0101	0900-1700M-F:0011-1300S	1000
R2	123456790	38.916006	-077.237926	0300	0355	0-23	1000
R3	123456791	38.91663	-77.22919	0300	0355	0-23	1004
	123456792	38.8591	-77.22644	0400	0412	0-23	1007

FIG. 4

Class ID	Description
0100	Legal
0101	Notary Public
0200	Automotive
0300	Banking
0355	Automated Teller
0400	Health & Saftey
0412	Emergency Room

FIG. 5

Docket No. 37622.[illegible]J100

Service Provider ID	Service Directory URI/URL	Ad Server URI/URL
1000	ldap://service.acmebank.com	adserv.acmebank.com
1001	sp.acmelaw.com	
1002	ldap://services.uspto.gov	

FIG. 6

Location Context				Type	Time Context	ItemID	DeviceID or Location
Lat1	Lat2	Lon1	Lon2				
32.9	33	-77.1	-77.2	Play Recorded Audio Reminder		/q/audioq/A5F339	0124:0023
32.9	33	-77.1	-77.2	Control Home Entrance Lights	1600-0500,M-F	/q/cntrlq/87ACEF	151.22.122.40:7900

FIG. 7

SERVICE CLASS or SERVICE CONTEXT	LOCATION CONTEXT				SOURCELOCATION		SOURCEADDRESS
	LAT1	LAT2	LON1	LON2	LAT1	LON2	
2234	38.91	-77.22	38.92	-77.24	38.9122	-77.22644	153.49.200.28
4321							

FIG. 8

AD_ID	SERVICE CONTEXT	SERVICE PROVIDERID	LOCAL REMOTE	MIMETYPE	DIMENSIONS	LOCATIONCONTEXT				CONTENTLOCATION
						LAT1	LAT2	LON1	LON2	
00400	4321	1000	Remote	audio/mpeg	1min.	38.91	39.00	-77.229	-77.237	https://adserv.acmebank.com/ads.cgi?ad=30
00401	2234	1001	Local	image/png	200x300pixels					/ad/local/images/403A69.png
00402	0101	1000								

FIG. 9

Fig. 10

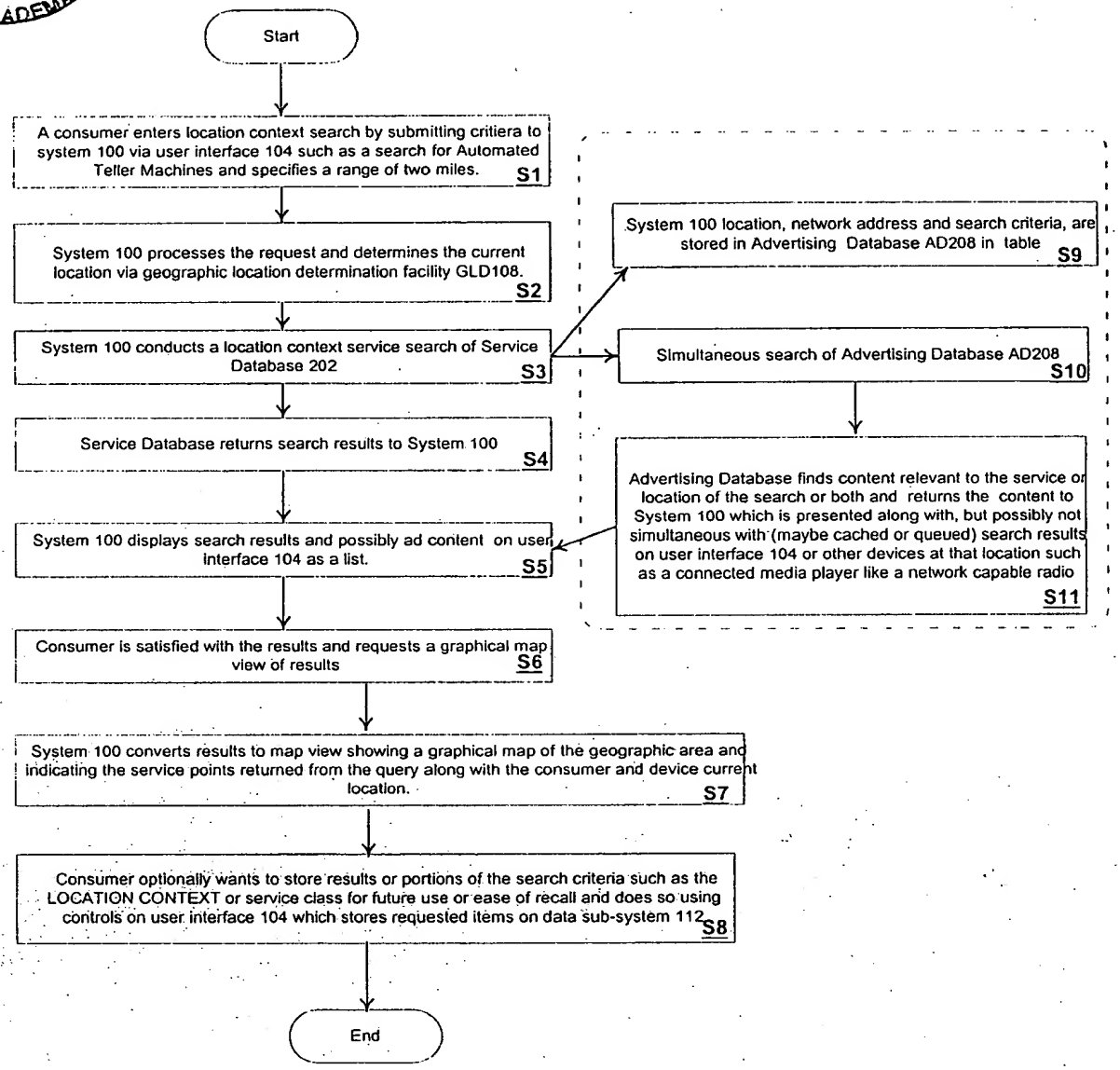

Fig. 11

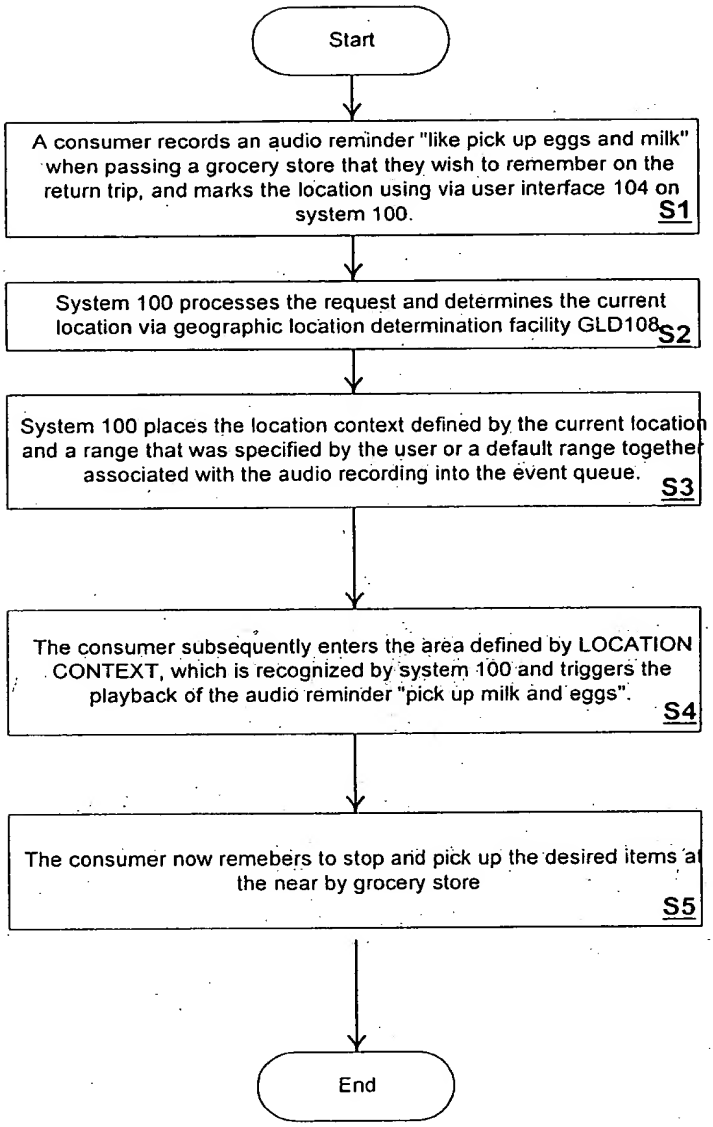

FIG. 12